

ELECTRONIC BOOK ELECTRONIC LINKS

Related Applications

This application is a continuation-in-part of U.S. Application Serial No. 08/336,247 entitled ELECTRONIC BOOK SELECTION AND DELIVERY SYSTEM, filed November 7, 1994, and U.S. Application Serial No. 08/160,194, entitled ADVANCED SET-TOP TERMINAL FOR CABLE TELEVISION DELIVERY SYSTEMS, filed December 2, 1993, and U.S. Application Serial No. 08/906,469, entitled REPROGRAMMABLE TERMINAL FOR SUGGESTING PROGRAMS OFFERED ON A TELEVISION PROGRAM DELIVERY SYSTEM, filed August 5, 1997 which is a continuation of U.S. Application Serial No. 08/160,281, entitled TERMINAL FOR SUGGESTING PROGRAMS OFFERED ON A TELEVISION PROGRAM DELIVERY SYSTEM, filed December 2, 1993, which is now U.S. Patent No. 5,798,785, dated August 25, 1998, and U.S. Application Serial No. _____, filed on even date herewith, entitled ELECTRONIC BOOK HAVING LIBRARY CATALOG MENU AND SEARCHING FEATURES. These applications are incorporated by reference herein.

Technical Field

This invention is directed to an electronic book unit having one or more electronic books. More specifically, the invention is an electronic book with links to other electronic files.

Background Art

Sparked by the concept of an information superhighway, a revolution will take place in the distribution of books. Not since the introduction of Gutenberg's movable typeset printing has the world stood on the brink of such a revolution in the distribution of text material. The definition of the word "book" will change drastically in the near future. Due to reasons such as security, convenience, cost, and other technical problems, book and magazine publishers are currently only able to distribute their products in paper form. This invention solves the problems encountered by publishers.

Summary Of Invention

1 An electronic book selection and delivery system is a new way to distribute
2 electronic books to bookstores, public libraries, schools and consumers. The
3 technological breakthroughs of this invention provide a secure system for both delivering
4 selected electronic books and receiving payments. The system has an unusual
5 combination of features that provides the consumer with an electronic book unit that has
6 a high tech aura while being very practical, portable, and easy to use.

7 The clear advantage of the system is that it eliminates the distribution of any
8 physical object such as a paper book or computer memory device from any book or text
9 distribution system. The purchase of an electronic book may become a PAY-PER-
10 READ™ event avoiding the overhead, "middle-men," printing costs, and time delay
11 associated with the current book distribution system. Published material and text such
12 as the President's speech, a new law, a court decision on abortion, or O.J. Simpson's
13 testimony can be made immediately available to the consumer at a nominal fee.

14 The system is a novel combination of new technology involving the television,
15 cable, telephone, and computer industries. It uses high bandwidth data transmissions,
16 strong security measures, sophisticated digital switching, high resolution visual displays,
17 novel controls, and user friendly interface software.

18 The primary components of the text delivery system are the subsystem for placing
19 the text onto a signal path and the subsystem for receiving and selecting text that was
20 placed on the signal path. The preferred embodiment of the system includes additional
21 components and optional features that enhance the system. The system may be
22 configured for use by bookstores, public libraries, schools and consumers.

23 The system for consumer use is made up of four subsystems, namely: (1) an
24 operations center, (2) a distribution system, (3) a home subsystem including reception,
25 selection, viewing, transacting and transmission capabilities, and (4) a billing and
26 collection system.

27 The operations center performs several primary functions: manipulating text data
28 (including receiving, formatting and storing of text data), security encoding of text,

1 cataloging of books, providing a messaging center capability, and performing uplink
2 functions. The system delivers the text from the operations center to consumer homes
3 by inserting text data into an appropriate signal path. The insertion of text is generally
4 performed with an encoder at an uplink site that is within or near the operations center.
5 If the signal path is a video signal path, the system can use several lines of the Vertical
6 Blanking Interval (VBI), all the lines of the analog video signal, a digital video signal or
7 unused portions of bandwidth to transmit text data. Using the VBI delivery method, the
8 top ten or twenty book titles may be transmitted with video during normal programming
9 utilizing existing cable, satellite, wireless or broadcast transmission capability without
10 disruption to the subscriber's video reception. Using the entire video signal, thousands
11 of books may be transmitted within just one hour of air time. Nearly any analog or digital
12 video distribution system may be used to deliver the video signal with included text.

13 The text data may also be transmitted over other low and high speed signal paths
14 including a telephone network (e.g., a public switched telephone network) having a high
15 speed connection such as an asynchronous digital subscriber line (ADSL) connection.

16 The home subsystem performs four primary functions: connecting to the video
17 distribution system, selecting text, storing text, and transacting through a phone or cable
18 communicating mechanism. The components of the home subsystem may be configured
19 in a variety of hardware configurations. Each function may be performed by a separate
20 component, the components may be integrated, or the capability of existing cable set top
21 converter boxes and televisions may be utilized. Preferably, a connector, library unit and
22 an electronic book unit, or viewer unit, are used. The connector portion of the home
23 subsystem receives the analog video signal and strips or extracts the text from the video.
24 The home library stores the text signal, provides a user friendly software interface to the
25 system and processes the transactions at the consumer home. The viewer provides a
26 screen for viewing text or menus and novel user friendly controls. The viewer may also
27 incorporate all the functionality of the home subsystem.

1 The viewing device is preferably a portable book shaped viewer which stores one
2 or more electronic books for viewing and provides a screen for interacting with the home
3 library unit. A high resolution LCD display is used to both read the books and to interact
4 with the home library software. An optional phone connector or return-path cable
5 connection initiates the telephone calls and, with the aid of the library, transmits the
6 necessary data to complete the ordering and billing portion of the consumer transaction.
7 The user friendly controls include a bookmark, current book and page turn button. The
8 billing and collection system performs transaction management, authorizations,
9 collections and publisher payments automatically utilizing the telephone system.

10 The electronic link system provides links to other electronics files. The other
11 electronic files may be associated with a specific electronic book. Examples include
12 book reviews and Internet databases. The other electronic files may be included as part
13 of a specific electronic book. Examples include links between a Table of Contents or an
14 Index, and the text of the specific electronic book. The other electronic files may be
15 stored in the viewer or home library unit. Examples include a dictionary and a foreign-
16 language translation dictionary.

17 The electronic links may be provided by the content supplier. That is, the
18 operations center, or the book's publisher, may provide additional electronic files, such
19 as the electronic dictionary, and may establish electronic links between the electronic
20 dictionary and the text data of a specific electronic book, for example.

21 The electronic links may be subscriber-defined. That is, the subscriber may select
22 a portion of the text of a specific electronic book, and generate a link between the portion
23 and another electronic file. For example, the subscriber may generate a link between a
24 Latin phrase in a specific book and its English translation in an electronic English
25 dictionary or an electronic Latin-English translation dictionary.

26 The electronic link may be created using a standard programming language. For
27 example, the links may be generated using Hypertext Markup Language (HTML).

1 A menu system may be provided to assist the subscriber to navigate through
2 different link options.

3 The electronic links may also link a viewer with an external device or data base.
4 For example, the electronic link may be used to access an Internet web site.

5 Brief Description Of Drawings

6 Figure 1 is a block diagram of the primary components of the electronic book
7 selection and delivery system.

8 Figure 2 is a schematic showing an overview of the electronic book selection and
9 delivery system.

10 Figure 3a is a schematic of the delivery plan for the electronic book selection and
11 delivery system.

12 Figure 3b is a schematic of an alternate delivery plan.

13 Figure 4 is a block diagram of an operations center.

14 Figure 5a is a flow diagram of the processing at the operations center and uplink.

15 Figure 5b is a block diagram of the hardware configuration for an uplink site.

16 Figure 6a is a block diagram of the hardware configuration for a four component
17 home subsystem.

18 Figure 6b is a schematic of a two unit home subsystem.

19 Figure 7 is a flow diagram of the processes performed by the video connector.

20 Figure 8 is a block diagram for an example of a library unit.

21 Figure 9 is a flow diagram of some of the processes performed by the library on
22 the received data stream.

23 Figure 10 is a flow diagram of the processes performed by the library unit on
24 information requests from the viewer.

25 Figure 11 is a block diagram showing the components for an example of a viewer.

26 Figure 12 is a flow diagram of some of the processes performed by the viewer on
27 an information request from a subscriber.

1 Figure 13 is a chart depicting the menu structure and sequencing of menus in the
2 menu system.

3 Figure 14a is a schematic of an introductory menu.

4 Figure 14b is a schematic showing an example of a main menu.

5 Figures 14c, 14d, 14e, 14f, 14g, 14h, 14i and 14j are schematics showing
6 examples of submenus.

7 Figure 15 is a schematic diagram of an electronic book system for a bookstore or
8 public library.

9 Figure 16a and Figure 16b are schematics of hardware modifications or upgrades
10 to a set top converter.

11 Figure 17 is a schematic showing a set top terminal that includes a data receiver
12 and data transmitter.

13 Figure 18a is a schematic of a book-on-demand system.

14 Figure 18b is a schematic of an operations center supporting a book-on-demand
15 system.

16 Figure 19 is a schematic of a page of an electronic book having electronic links.

17 Figure 20 is a schematic of a page of an electronic book with the electronic links
18 shown.

19 Figure 21 is a schematic of a show links submenu.

20 Figure 22 is an example of links in an electronic book.

21 Disclosure Of Invention

22 The primary components of the electronic book selection and delivery system 200
23 are an encoder 204, a video distribution system 208, a connector 212, and a text selector
24 216 as shown in Figure 1. The encoder 204 places textual data on a video signal to form
25 a composite video signal. Although the composite signal may contain only textual data,
26 it usually carries both video and textual data. A variety of equipment and methods may
27 be used to encode text data onto a video signal. The video distribution system 208
28 distributes the composite video signal from the single point of the encoder 204 to

1 multiple locations which have connectors 212. The connector 212 receives the digital or
2 analog video signal from the video distribution system 208 and separates, strips or
3 extracts the text data from the composite video signal. If necessary, the extracted text
4 data is converted into a digital bit stream. Text selector 216 works in connection with the
5 connector 212 to select text.

6 Using a connector 212 and text selector 216 combination, various methods of
7 selecting and retrieving desired text from a composite or video signal are possible. Text
8 may be preselected, selected as received or selected after being received and stored. The
9 preferred method is for the connector 212 to strip or extract all the text from the video
10 signal and have the text selector 216 screen all the text as received from the connector
11 212. The text selector 216 only stores text in long term or permanent memory if the text
12 passes a screening process described below.

13 An overview of the electronic book selection and delivery system 200 is shown
14 in Figure 2. The delivery system 200 includes: an operations center 250 including an
15 uplink site 254, a video distribution system 208, a home system 258 including a video
16 connector 212, a library 262, a viewer 266, and a phone connector 270, telephone system
17 274, an internet web site 279 and a billing and collection system 278. Also as shown in
18 Figure 2, the home system 258 may include connections to a television 259 and a
19 personal computer 261. The television 259 and the personal computer 261 may be used
20 to display menu screens, electronic books, electronic files, or any other information
21 associated with the delivery system 200. In addition, the television 259 and the personal
22 computer 261 may provide control function that replicate and supplement those of the
23 viewer 266.

24 The operations center 250 receives textual material from outside sources 282 such
25 as publishers, newspapers, and on-line services. Alternately, the outside sources may
26 maintain electronic books at the Internet web site 279. The outside sources 282 may
27 convert textual and graphical material to digital format, or may contract with another
28 vendor to provide this service. The operations center 250 may receive the textual and

1 graphical material in various digital formats and may convert the textual material to a
2 standard compressed format for storage. In so doing, the operations center 250 may
3 create a pool of textual material that is available to be delivered to the home system 258.
4 The textual material may be grouped by books or titles for easy access.

5 As used herein, "book" means textual or graphical information such as contained
6 in any novels, encyclopedias, articles, magazines or manuals. The term "title" may
7 represent the actual title assigned by an author to a book, or any other designation
8 indicating a particular group, portion, or category of textual information. The title may
9 refer to a series of related textual information, a grouping of textual information, or a
10 portion of textual data. For example, "Latest Harlequin Romance", "Four Child Reading
11 Books (Ages 10-12)", "Encyclopedia 'BRITANNICA'™", "President's Speech",
12 "Instruction Manual", "Schedule of 4th of July Events", "Pet Handbooks", "Roe v.
13 Wade", and "The Joy of Cooking" are suitable titles. Also, the title may be a graphical
14 symbol or icon. Thus, a picture of a wrench may be a title for a repair book, a picture of
15 a computer a title for a computer book, a graphical symbol of a telephone a title for a
16 telephone book, a drawing of a dagger a title for a mystery book, a picture of a bat and
17 ball a title for a sports book and a picture of tickertape a title for a business book. The
18 term "electronic book" refers to the electronic counterpart to a "book."

19 The operations center 250 includes an uplink site 254 for placing the text onto a
20 video signal and sending the composite video signal into a video distribution system. The
21 uplink site 254 would generally include an encoder 204 (not shown in Figure 2) to encode
22 the text onto a video signal.

23 Many analog and digital distribution systems 208, or other telecommunications
24 systems, can be used with the delivery system 200, such as a cable television distribution
25 system, a broadcast television distribution system, video distributed over telephone
26 systems, distribution from the Internet, direct satellite broadcast distribution systems, and
27 other wired and wireless distribution systems.

1 The home system 258 performs five primary functions: (1) connecting with a
2 video distribution system, (2) selecting data, (3) storing data, (4) displaying data, and (5)
3 handling transactions. An important optional function of the home sub-system 258 is
4 communicating using a telephone communication system 274. The home system 258 is
5 made up of primarily four parts: a video connector 212 or similar type of connector for
6 connecting with the video distribution system 208, a library unit 262 for storing and
7 processing, an electronic book, or viewer unit, 266 for viewing menus and text and a
8 telephone connector 270 for connecting with a telephone communications system 274.
9 In an alternate arrangement, the viewer 266 may include all the functionality of the home
10 system 258.

11 The billing and collection system 278 may be co-located with the operations
12 center 250 or located remote from the operations center 250. The billing and collection
13 system 278 is in communication with the home system 258 via telephone-type
14 communication systems (for example 274). Any of a number of telephone type
15 communication systems, such as, a cellular system, will operate with the billing and
16 collection system 278. The billing and collection system 278 records the electronic books
17 or portions of text that are selected or ordered by the subscriber. The collection system
18 will charge a subscriber's credit account or bill the subscriber. In addition, the billing and
19 collection system 278 will monitor that amount due to publishers or other outside sources
20 282 who have provided textual data or other services such as air time to enable the text
21 delivery system 200 to operate.

22 When electronic books are provided via the Internet web site 279, the billing and
23 collecting functions may be incorporated into the Internet web site 279. For example, a
24 subscriber may pay for an electronic book selection by entering a credit card number into
25 a data field of a page of the Internet web site 279. In this configuration, a separate billing
26 and collection system may not be required.

27 Figure 3a is an expanded overview of a delivery plan 301 for the delivery system
28 200. The delivery plan 301 supports various types of subscribers and various billing

1 systems. Figure 3a shows that publishers 282 will provide text transfer 302 to the
2 operations center 250' and receive payments 306 from the billing and collection system
3 278'. A separate channel uplink site 254' is shown in this configuration receiving data
4 310 from the operations center 250'. The operations center 250' has three separate
5 sections (318, 322, 326) one for text receiving, formatting and re-entry 318, a second for
6 security encoding 322 and a third section for catalog and messaging center functions 326.

7 The billing and collection system 278' shown has two sections (330, 334) one for
8 transaction management, authorizations and publisher payments 330, and the other for
9 customer service 334. The customer service section 334 provides for data entry and
10 access to customer account information. Transaction accounting information 338 is
11 supplied to credit card companies 342 by the transaction management section 330 of the
12 billing and collection system 278'. The credit card companies 342 provide billing 346 to
13 customers either electronically or by mail.

14 Three methods for communicating between the subscriber base 348 and the
15 billing and collection system 278' are shown: by telephone switching 350 alone, cellular
16 switching 354 and telephone switching 350 combined, and by use of the cable system 358
17 and the telephone switching 350. The system shown supports both one-way 362 and two-
18 way cable communication 366 with subscribers. Public libraries and schools 370 as well
19 as bookstores 374 may use the delivery system 301.

20 Public libraries and schools 370 would have a modified system to allow the
21 viewer 266 to be checked-out or borrowed while bookstores 374 would rent or sell the
22 viewer 266 and sell the electronic books. The bookstores 374 as well as the public
23 libraries and schools 370 may be serviced by cable 378. Optional direct broadcast
24 systems (DBS) 382 can also be used with the delivery system 200. The DBS 382 may
25 provide the electronic books using digital satellite technology, with the electronic books
26 being received via a backyard satellite antenna, for example.

27 Figure 3b is an alternate delivery plan 301' that provides for electronic book
28 selection and delivery using the Internet. In Figure 3b, the publishers 282 provide the

1 electronic books to be posted at the Internet web site 279. The publishers may convert
2 the text and graphical data to digital format, compress the digital data, and upload the
3 compressed digital data to the Internet web site 279. Alternately, the publishers 282 may
4 arrange for an outside conversion activity 283 to convert the text and graphical data to
5 digital format. The conversion activity 283 may then provide the digital data to the
6 Internet web site 279. For example, a large on-line bookstore could gather publications
7 in electronic form from a variety of publishers, or could convert hard-copy books to
8 electronic form, and post the electronic books on the Internet such as at the Internet web
9 site 279.

10 The electronic books may then be transferred via a public switched telephone
11 network (PSTN), for example, direct to a subscriber 285, a library 286 and a bookstore
12 287. The library 286 and the bookstore 287 may also provide electronic books to the
13 subscriber 285.

14 I. The Operations Center

15 Figure 4 is a schematic of an operations center 250 which includes an uplink 254.
16 The operations center 250 gathers text or books by receiving, formatting, storing, and
17 encoding. A data stream 302 containing text is received at the operations center 250 by
18 a data receiver 402. The data receiver 402 is under the control of a processor 404. After
19 reception, the data stream is formatted using digital logic for formatting 406 which is also
20 under the control of the processor 404. If any additional text is being generated at the
21 operation center 250 locally for insertion into the distributed signal, the text generation
22 is handled through text generator hardware 410 which may include a data receiver and
23 a keyboard (not shown). Following processing by the text generator 410, the additional
24 text can be added to the text received by the combining hardware 414 that includes digital
25 logic circuitry (not shown).

26 The processing at the operations center 250 is controlled by a processor 404
27 which uses an instruction memory 416. The processor 404 and instruction memory 416
28 may be supplied by a personal computer or mini-computer. To perform the catalog and

1 messaging functions, the operations center 250 uses a catalog and message memory 420
2 and the text generator 410 if necessary.

3 The data stream of text, catalog and messages is preferably encoded by security
4 module encoding 424 prior to being sent to the uplink module 254. Various encoding
5 techniques may be used by the security encoding module 424 such as the commercial
6 derivative of NSA's encryption algorithm (Data Encryption System (DES)) and General
7 Instrument's DigiCipher II. Following encoding, the encoded text may be stored in text
8 memory 428 prior to being sent to the uplink 254. A first-in-first-out text memory
9 arrangement may be used under the control of the processor 404. Various types of
10 memory may be used for the text memory 428 including RAM. The operations center
11 250 may use file server technology for the text memory 428 to catalog and spool
12 electronic books for transmission as is described below.

13 To transmit textual data (i.e., electronic books), the delivery system 208 uses high
14 bandwidth transmission techniques such as those defined by the North American
15 Broadcast Teletext Standard (NABTS) and the World System Teletext (WST) standard.
16 Using the WST format (where each line of the Vertical Blanking Interval contains 266
17 data bits), a four hundred page book, for example, may be transmitted during
18 programming using four lines of the Vertical Blanking Interval at a rate of approximately
19 one book every 1.6 minutes (63,840 bits per second). Alternatively, electronic books may
20 be transmitted over a dedicated channel, which interrupts programming so that 246 lines
21 of video can be used to transmit approximately 2,250 books every hour (3.9 Mbits per
22 second). A teletext type format is the simplest but possibly the slowest text format to use
23 with the delivery system 200. In either event, an encoder 204 is utilized at an uplink site
24 254 to insert textual data into the analog video signal. In many other respects, the
25 delivery of the textual information is completed using existing cable television plant and
26 equipment.

27 Figure 5a is a flowchart of the steps involved in processing text from the publisher
28 or provider 282 that occurs at the operations center 250. As shown in block 500, the

1 publisher 282 processes data files of text for books, compresses, encrypts and sends the
2 data files to the operations center 250 or uplink 254. Text files for books are preferably
3 sent one book at a time. As shown in block 504, the uplink 254 or operations center 250
4 receives and processes the data stream from the publisher 282. Generally, part of this
5 processing includes encryption and error correction.

6 As shown in block 508, files are broken into smaller packets of information.
7 Header information is added to the packets. The bit stream is converted from a serial
8 digital bit stream to an analog bit stream that is compatible with an NTSC video signal.
9 Block 512 shows the switching of analog data into the video lines of a video signal. The
10 analog data is generally placed either in the VBI or the active video lines. In some
11 instances, it may be preferable to utilize unused portions of bandwidth (such as 5-40
12 MHZ, 70-75 MHZ, 100-109 MHZ or other guard bands) instead of the video lines.

13 Figure 5b is an example of a hardware configuration to perform some of the
14 functions for blocks 508 and 512. A video feed 516 is received and processed through
15 a sync stripper 520. The stripped sync signal 532 is used by the digital logic control 524.
16 The digital logic control 524 receives the sync signal 532 and a serial digital bit stream
17 528 for processing. The digital logic control 524 passes the serial digital bit stream to the
18 Digital to Analog converter 536 and outputs a control signal 540 for the video switch
19 544. The video switch 544 integrates the video feed 516 and analog data stream 548 into
20 a video feed with analog data signal inserted 552.

21 As an alternative to cable, satellite, broadcast, or other television delivery
22 methods, the public telephone system may be used to transmit books to the subscribers.
23 An average electronic book would take about 7 minutes to transmit over the public
24 telephone system. Using the telephone system, it is not necessary to combine video and
25 text into a composite signal. In most other respects, the operation center would remain
26 similar whether text delivery was by telephone or cable. File server technology (such as
27 that described in U.S. Patent No. 5,262,875, entitled AUDIO/VIDEO FILE SERVER
28 INCLUDING DECOMPRESSION/PLAYBACK MEANS, issued to Mincer, et al., and,

1 U.S. Patent No. 5,218,695, entitled FILE SERVER SYSTEM HAVING HIGH-SPEED
2 WRITE EXECUTION, issued to Noveck, et al., incorporated herein by reference) may
3 be used at the operation center with a telephone system text delivery method.

4 As another alternative to cable, television, and telephone system delivery, the
5 public telephone system may be used to provide access to the Internet, where the Internet
6 web site 279 may be accessed. Electronic books may be ordered, paid for, and delivered
7 directly from the Internet web site 279 over the telephone system.

8 In any delivery system using the telephone system, individual subscribers may
9 increase the electronic book deliver rate by incorporating high speed modems or other
10 communication devices such as an Integrated Services Digital Network (ISDN)
11 connector, or by use of an Asymmetric Digital Subscriber Line (ADSL)

12 II. The Home System

13 The hardware configuration for a four component home system 258 is shown in
14 Figure 6a. Figure 6b shows a hardware configuration for a two component home system.
15 The hardware components may also be incorporated into a single unit that communicates
16 with a terminal in a television delivery system or with a telephone system by use of a
17 modem, for example. The home system 258 performs several functions, such as
18 receiving data and video transmissions, stripping (or extracting) the data from the video
19 signal, screening and storing the data, providing user friendly interface controls and
20 software, displaying menus and text, processing transactions, initiating telephone calls
21 and transmitting billing data. Various hardware configurations may be utilized to achieve
22 the desired functions of the home system 258. For example, as shown in Figure 6b, the
23 home system 258 can be configured to utilize the reception and channel tuning capability
24 of the current installed subscriber base of cable converter boxes and televisions 601. The
25 home system 258 can also be designed as an advanced set top terminal converter box
26 with menu generation capability, electronic memory and a telephone modem as described
27 in section V below.

1 The electronic components which make up the home system 258 can be arranged
2 in a variety of ways. In the four unit system of Figure 6a the viewer 266 and library unit
3 262 are wired together while the remaining components communicate through RF
4 transceivers 604. In a simple version of the home system 258 there are only two units,
5 the library unit 262 and a viewer 266. Figure 6b shows a two unit home system 258 with
6 certain optional features. Finally, all the functionality of the home system 258 may be
7 incorporated into one electronic book unit, or viewer.

8 The viewer 266 is generally equipped with a high resolution viewing area 602,
9 digital logic (including a key 605, security 606, and a microprocessor 621), video
10 graphics control and memory 607, power supply circuitry 602 (not shown), an optional
11 battery 603 and an optional RF transceiver 604. In a two unit arrangement, the library
12 unit 262 contains the connector function to the video distribution system 208, connector
13 function to a public telephone communications system, and memory 600 (which may be
14 removable and portable 600'). More specifically, the library unit 262 would include data
15 stripping functions 617, digital logic 609, memory storage 600, power circuitry 610,
16 optional telephone connections 611 (including cellular or PCN 611'), optional battery (not
17 shown), optional tuner module 613 and an optional RF transceiver 604. The video
18 connector 212 and the public telephone system connection 270, as well as the removable
19 portable memory unit 600 of the library unit 262 may be broken out into separate
20 components. (Figure 6b shows a removable portable hard disk memory 600' with
21 removable cartridges 614.) Finally, the home system 258 may include an attached
22 keyboard 267 or a wireless keyboard 268. Both the attached keyboard 267 and the
23 wireless keyboard 268 may be used to communicate with the viewer 266 (not shown) or
24 the library unit 262.

25 The wireless keyboard 268 may communicate via radio frequency (RF) signaling,
26 for example. Therefore, the home system 258 may have as many as six separate
27 components which communicate with each other. The two, three, four, five or six
28 separate components which make up the home system 258 can communicate with each

1 other in a variety of ways, including hardwired connection 615, RF transceiver 604, and
2 other wireless methods.

3 RF communications are preferred in the home because they allow separate
4 components to be located throughout the home without restriction. The data
5 communicated between the units is preferably secure data. In addition, the library unit
6 262 may provide power to the viewer 266 through the hardwired connection 615.

7 Alternatively, a single unit may perform all of the home system 258 functions.
8 The single unit should use light-weight materials, including a light-weight battery. A
9 single unit eliminates the need to communicate (externally) between units. The single
10 unit is less expensive and eliminates duplicative processing, memory storage and power
11 circuitry.

12 To receive and strip the data from the video signal at the consumer's home, either
13 a cable interface device or cable connector 212 is used. The cable connector device
14 includes a tuner 613, while the cable interface device makes use of existing tuning
15 equipment in the home. In either configuration, data is stripped from the video signal
16 and stored at the subscriber's location in the library unit 262. The phone connector 270,
17 and modem 611 initiate telephone calls and transmit ordering and billing information to
18 the operations center 250 or billing and collection system 278. Alternatively, the phone
19 connector 270 and the modem 611 may be used to provide access to the Internet to order
20 and receive electronic books from an Internet web site. A digital connector 619 is
21 provided to communicate digital information with the set top 601. The library unit 262
22 is the intelligent component of the home system, incorporating the hardware and software
23 necessary to store the text data, generate menus and effect the purchase transactions. In
24 addition to an RF transceiver 604, the library unit 262 also includes the necessary jacks
25 and connections to allow the delivery system 200 to be connected to the viewer 266. As
26 shown in Figure 6b, the library 262 communicates the text data (electronic book) to the
27 viewer 266 in a secure format which requires a key 605 for decryption. The text is
28 generally only decrypted page by page just before viewing.

1 a. The Video Connector

2 Figure 7 shows the flow of the processes performed by the video connector 212.
3 The video connector receives the video signal 608, tunes to the channel containing the
4 text data 612, strips the text data from the video signal 616, and communicates the text
5 data stream to logic components in the library 620.

6 The connection to the video distribution system is preferably a cable connector
7 to a cable television delivery system, as shown in Figure 6b. The cable connector
8 includes a data stripper circuit 617, which accepts video input from either a set top
9 converter, TV or VCR 601, or an optional tuner block 613 that receives the CATV signal
10 through the cable connector 212'. The data stripper circuit 617 strips data out of the
11 video, and outputs a digital bit stream to the digital logic portion 609 of the library unit
12 262. The data is embedded in the video signal either in the vertical blanking interval or
13 the active video portion in an encrypted and compressed format. The data stripper circuit
14 617 can be placed inside the set top converter box 601, TV, or in the library unit. The
15 data stripper circuit 617 outputs the digital bit stream to be used by the library digital
16 logic 609.

17 The video connector 212 may also contain a channel tuner module 613 that can
18 tune to the video channel and provide access to the video that contains the data to be
19 stripped. Using the optional tuner module 613, a set top converter, VCR, or TV tuner is
20 not needed in the home system. The optional tuner module 613 would instead receive
21 the CATV signal directly through the cable connector 212.

22 b. Library

23 An embodiment of the library unit 262 for a two unit home system 258 is shown
24 in both Figure 6b and Figure 8. The embodiment shown includes the following optional
25 parts: the video connector 212, phone connector 270, RF transceiver 604, and battery

1 pack 624 in addition to a removal portable memory 600', microprocessor 628, instruction
2 memory unit 632, digital logic 636, and power unit 640.

3 The library unit 262 contains a digital logic section 609 (not shown in Figure 8),
4 which includes the microprocessor 628, the digital logic 636 and the instruction memory
5 unit 632. The microprocessor 628 is preferably a secure microprocessor such as the Mot
6 SC21 device sold by Motorola. The digital logic section 609 will receive the serial digital
7 bit stream from the data stripper circuit 617 and process the data. Error correction will
8 also be performed by the digital logic section 609 and the data will be checked for proper
9 address. If the address of the data is correct and the library unit 262 is authorized to
10 receive the data, the data will be transferred to the memory storage unit 600, 600'.
11 Authorization to receive the data is provided by the cable headend or another distribution
12 point. An authorization code may be sent in the serial digital bit stream. The digital logic
13 section 609 will send appropriate text and graphical data to the memory storage unit 600,
14 600'. It transfers this data in a compressed and encrypted format and the data remains
15 stored in a compressed and encrypted format.

16 i. Memory Storage Unit

17 The memory storage unit of the library may be a removable portable memory unit
18 600' (as shown in Figures 6a, 6b and 8). A variety of options are available for memory
19 storage: a hard disk drive, a hard disk with removable platters, and a CD ROM.
20 Referring to Figure 6b, a hard disk drive unit 600' which contains removable platters may
21 also be used. This would provide virtually unlimited library storage capacity. Data (i.e.,
22 electronic book files) may be stored in the memory storage unit in a compressed and
23 encrypted format. As is also shown in Figure 6b, the data may also contain a key or
24 unique ID number that matches the ID or key of the viewer 266. This matching of a
25 unique key or ID number prevents unauthorized transfer of text data from the memory
26 storage unit to an unauthorized viewer. Small memory devices such as smart cards,
27 electronic memory cards or PCMCIA cards (personal computer memory card industry
28 association) may also be used to store the data.

1 ii. Power Circuitry

2 As shown in figures 6b and 8, the library unit 262 may accept power from either
3 AC wall power 610, DC power 640, or optional battery power 624. The power circuitry
4 610, 640 may provide all the voltage necessary from either the battery 624 or AC unit for
5 the various circuitry in the library. The power circuitry 610, 640 may also provide power
6 to the viewer 266 through a single data cable when connected to the viewer. The power
7 circuitry 610, 640 will recharge the battery using AC power when in operation. With the
8 optional battery unit 624 installed, the library unit 262 becomes a portable unit and can
9 still provide power to the viewer 266. In order to extend battery life, power conservation
10 measures may be utilized, such as shutting down the memory system when not in use.
11 When the viewer 266 is being utilized and the library circuitry is not being utilized,
12 virtually all power may be shut down to the library unit 262.

13 iii. Connection to the Public Telephone System

14 The connection to the telephone system may be provided by a modem 611.
15 Various available modems may be used to perform this function. As shown in Figure 6b,
16 cellular phone or PCN phone connections 611' may also be provided. When the home
17 system 258 is first initialized, the modem may be used to transfer the name and credit
18 card information of the consumer to the billing and collection system 278. The telephone
19 connection 270 may be utilized each time an electronic book is purchased by a consumer
20 to complete and record the transaction. The telephone connection 270 may also be used
21 as a means for receiving the electronic books from the operations center 250 or from an
22 Internet web site, by-passing the video distribution system 208. The phone connection
23 270 may be a separate unit as shown in Figure 6b.

24 iv. Library Processing

25 Figure 9 shows an example of some basic processing performed by the library unit
26 262 on the data stream 651 received from the video connector 212 or stripper circuit 617.

1 First the data stream 651 is checked for error correction by block 650. If an error is
2 detected, block 654 de-interleaves the data followed by block 658 running a FEC
3 (Forward Error Correcting) algorithm. The combination of block 650, 654 and 658
4 perform the error correction needed on the data stream. If no error correction is necessary
5 the data proceeds to block 662 where packets are individually checked for packet address.

6 If the address is a unique address, block 666 checks whether the address of the
7 packet matches the library box ID number. The library box ID number is a unique
8 number associated with that library unit 262 which is used to ensure security of the data.
9 Block 670 determines whether an electronic file has already been opened into which the
10 data packet can be saved. If no data file has been opened then block 674 opens a new
11 data file for that packet. If an electronic file has been opened, then the packet is saved
12 in that electronic file on disk, block 678. Next, the process checks to see if this is the last
13 packet for a particular book for a particular textual data block being received 682. If it
14 is the last packet of information, then the electronic file is closed and the directory of
15 available electronic files is updated 686. Following either block 682 or 686, the process
16 returns to receive another data packet from the data stream received from the data stripper
17 block.

18 If the packet address is checked and the address is determined to be a broadcast
19 address, the process determines the type of message that is being sent 690. The message
20 may be an index of book titles, menu (and menu graphics) information, announcements,
21 special offerings, discounts, promotions, previews etc. The message is then stored in
22 appropriate electronic message file 694 and the process is returned to block 650 to receive
23 another data packet and perform another error check.

24 Using the process of Figure 9, the library unit 262 is able to receive, store and
25 update directories related to the textual data and graphical data (that can be used to depict
26 pictures in a given book or to generate menus). Variations of the processes are possible
27 depending on the format of the data and operating system of the library unit 262.

1 Figure 10 shows an example of the processing of information requests from the
2 viewer 266 at the library unit 262. Information requests from the viewer 266 are received
3 either through the cable connecting the viewer 266 to the library unit 262 or through
4 wireless transmissions such as RF. It is possible in some embodiments for subscribers'
5 requests to come from a set top converter box 602 (see Section V).

6 Information requests received from the viewer 266 generally fall into three
7 categories: (1) directory data of electronic books stored in the library unit 262, (2) index
8 of all available electronic books on the system, and (3) requests for a specific electronic
9 book (Block 700). Process block 704 answers a request from the viewer 266 for a
10 directory of data showing the electronic books stored at the viewer 266. The directory
11 of data is sent to the viewer 266 so that it may be displayed to the subscriber. Process
12 block 708 handles requests from the viewer 266 for an index of all available electronic
13 books on the home system 258. The library unit 262 will obtain an index of all the
14 available books on the system and transmit that index, process 712, with menu
15 information to the viewer 266. Process block 716 replies to a request from the viewer
16 266 for a specific electronic book. The library unit 262 opens an electronic file for the
17 specific electronic book requested by the viewer 266 and transmits the record or transmits
18 the information 720 on a packet-by-packet basis to the viewer 266. This process of
19 transmitting the specific electronic book, record, or packets to the viewer 266 continues
20 until the last record or packet has been sent, 724.

21 In addition to the processes shown on Figure 10 in handling a request for a
22 specific electronic book, the library unit 262 also orders and receives specific electronic
23 books from the operations center 250 using the process as described in process block 716.
24 Following a request for a specific electronic book which is not stored at the library unit
25 262, the library unit 262 will proceed to determine the next available time the electronic
26 book will be on the video distribution system 208 and ensure reception and storage of that
27 electronic book (process not shown). In performing this process the library unit 262 will
28 transmit to the viewer 266 information on when it will obtain the text data for the

1 electronic book so that the subscriber may view the electronic book. In addition to timing
2 information, price and other ordering information may also be passed by the library unit
3 262 to the subscriber.

4 c. The Viewer

5 Figure 11 is a block diagram of the viewer 266 showing its internal components.
6 The viewer 266 of Figure 11 is similar to the viewer 266 depicted in Figure 6b. The
7 viewer 266 is designed to physically resemble a bound book. The viewer 266 is made
8 up of five primary components and six optional components: (1) LCD display 602, (2)
9 digital circuitry (not shown), (3) video graphics controller 607', (4) controls 740, (5) book
10 memory 728, (6) optional power supply circuitry 736, (7) optional battery 603', (8)
11 optional RF transceiver 604, (9) optional cellular or mobile communicator (608), (10)
12 optional keyboards 267 and 268, and (11) a speaker/microphone 608'.

13 (1) A high resolution LCD screen 602, preferably of VGA quality, is used by
14 the viewer 266 to display text and graphic images. The screen is preferably the size of
15 one page of a book. A two page screen or two screens may also be used with the viewer
16 266.

17 (2) Digital circuitry that includes a secure microprocessor 621, instruction
18 memory 732, and digital logic. Data is transferred to the viewer 266 in compressed and
19 encrypted format. The secure microprocessor 621 compares the ID number of the viewer
20 266 with the incoming data stream and only stores the text data if the ID number of the
21 viewer 266 matches that within the incoming data stream. It is preferred that the viewer
22 266 not output text data or other data and that the data is decompressed and decrypted
23 only at the moment of viewing and only for the current page being viewed. These
24 measures are preferred because they provide additional security against unauthorized
25 access to data.

26 (3) A video graphics controller 607' that is capable of assisting and displaying
27 VGA quality text and graphic images is included in the viewer 266. The graphics

1 controller 607' is controlled by the digital circuitry described above. Text may be
2 displayed in multiple font sizes.

3 (4) The viewer 266 of Figure 11 has touch panel controls 740. These unique
4 and novel controls 740 allow the consumer to select stored electronic books and
5 electronic books from catalogues, move a cursor, and turn pages in a book. Typically,
6 the preferred controls 740 include forward and reverse page buttons 742, 741, a ball (or
7 trackball) 743 for cursor movement, one or more selection buttons 745, a current book
8 button 747 and a bookmark button 749 (see Figure 14a).

9 The controls 740 should be easy to use and conveniently located. Referring to
10 Figure 14a, the controls for the viewer 266 may be located below the screen 602 at the
11 bottom portion of the viewer 266. The next page turn button 742 is the most used button
12 740 and may be located towards the right edge of the page. The subscriber is likely to use
13 right hand thumb movements to work the controls particularly the page turn buttons 741,
14 742. Therefore, it is preferred that the buttons be arranged in such a manner that the
15 buttons are easily controlled by a subscriber's right thumb. Generally, this can be
16 accommodated either on the lower portion of the viewer 266 (as shown) or along the right
17 hand margin of the viewer 266 (not shown). The current book button 747 and bookmark
18 button 749 are usually the least used of the controls 740. Therefore, in the example
19 shown those buttons 747, 749 are located on the inside portion towards the binder of the
20 viewer 266.

21 Locating the ball 743 or other cursor movement device (such as four pointer
22 arrows -- not shown) in the bottom center of the viewer 266 is both easier for the
23 subscriber to use and easier in manufacturing the viewer 266. The selection buttons for
24 the cursor 745 are preferably located below the middle diameter of the cursor ball 743 on
25 the right and left sides of the ball as shown. If pointer arrows are used for cursor
26 movement, a selection button 745 may be located in the center of the four arrow buttons
27 (not shown). Again, the most used controls should be located where a subscriber's right
28 hand thumb would normally rest.

(5) Book memory 728 for at least one electronic book or more of text is included in the viewer 266. The memory 728 stores text and any graphics which represent pictures in a book. The memory 728 can also store menu graphics data. Two different memory 728 devices may be used in the viewer 266, one for the instructions for the microprocessor 621 in the digital circuitry and a second type of memory may be used for the book memory 728 (and graphics). Various memory devices available on the market may be used such as, ROM, RAM or a small hard disk. Since an electronic book requires approximately 0.6 megabytes of storage, a small hard disk providing approximately 60 MBytes of storage provides memory to store approximately 100 electronic books. The large hard disk drives currently available allow for storage of thousands of electronic books.

Text for books may be displayed in various font sizes. To accommodate various fonts for display, a variety of fonts are stored in instruction 732 or book memory 728. Thus larger or smaller fonts may be recalled from memory 621, 728 to create displays desired by the subscriber.

(6) Power supply circuitry 736 in the viewer 266 will accept power from either an AC power source or from an optional battery 603', or the library unit 262. The power supply circuitry 736 provides the necessary voltages to accommodate the various systems within the viewer 266.

(7) An optional battery 603' is provided in the preferred embodiment. The battery 603' is automatically recharged when AC power is available.

(8) An optional RF transceiver 604 which provided two-way data link between the viewer 266 and other components of the home system can also be included in the viewer 266.

(9) Also, the viewer 266 may include a cellular transceiver for mobile communications.

1 (10) The optional wired (attached) keyboard 267 and wireless (e.g., RF)
2 keyboard 268 (see Figure 6a) may be used with the viewer 266 to provide
3 communications between the subscriber and the viewer 266.

4 (11) The speaker and microphone 608' allow the viewer 266 to provide audio
5 signals to the subscriber, and allow the subscriber to provide an audio input. The speaker
6 and microphone 608' may be used in conjunction with the cellular transceiver 608 or
7 other telecommunications equipment to provide for reception and transmission of
8 telephony and data.

9 The viewer 266 of Figure 11 has parts available for providing connections to: a
10 library 744, electronic card memory 748, CD ROM units 752, and a portable memory unit
11 756 (such as that shown in Figure 6b 600'). Various electronic memory cards such as
12 PCMCIA can be used with this viewer 266.

13 Security, low power consumption and excellent display technology are desired
14 features of the viewer 266 design. The viewer 266 should be lightweight and portable.
15 The viewer 266 contains a software operating system that allows electronic books to be
16 stored, read and erased and includes the capability to order electronic books and retain
17 them in memory 728 for a predefined period of time determined by the system operator.
18 The software can be configured to allow the electronic book to be read during a period
19 of time (i.e., two weeks) and then automatically erased, read once and erased, or held in
20 memory permanently. Each viewer 266 has a unique key 605. All of the data storage is
21 encrypted with the key 605 for an individual viewer 266 to prevent more than one viewer
22 266 accessing the text file or electronic book file.

23 Figure 12 is a flow diagram of some of the processes executed by the viewer 266.
24 Generally, the viewer 266 receives inputs from the subscriber through touch panel
25 controls 740. Alternately, the viewer 266 receives inputs from a touchscreen display, the
26 attached keyboard 267, or the remote keyboard 268. The subscriber's information
27 requests are then processed 800 by the viewer 266.

1 If the subscriber requests a menu of available electronic books, process block 804
2 will select a book menu. Process block 808 will open the electronic files which list the
3 electronic books that are available (related to the category of topic of the menu) and
4 display the menu with the names of the available electronic books.

5 If the subscriber selects a particular electronic book to read, then process block
6 812 will process the selection and determine the electronic file that contains the specific
7 electronic book. Process block 816 will open the file for that specific book and normally
8 access the first page. (If a pointer has already been set in that electronic book's file, the
9 process may default to that page.) Process block 820 will then determine which page
10 needs to be displayed. Process block 820 will determine whether a next page, previous
11 page or a book marked page needs to be displayed. If the pointer for the electronic file
12 is not in the correct location then process block 828 will move the pointer and obtain the
13 previous page of data from the stored file. Otherwise, process block 824 will normally
14 obtain the next page of text from the stored electronic file. Process block 832 will
15 decrypt and decompress the text data and send the data to the video display. The video
16 display will generally have a video display memory associated with it and process block
17 832 will send the data directly to that video display memory. The circuitry for the display
18 then completes the process of displaying the page of text.

19 If the subscriber, through the controls 740, requests (from process block 800) that
20 the power be turned off, then the process, 836, of turning the power off will be initiated.
21 Process block 840 saves the pointer in memory to the page number in the book that the
22 viewer 266 is currently reading. Process block 844 closes all the electronic files and
23 signals the power circuitry to shut down the power to the various circuits in the viewer
24 266. The subscriber may also use the controls 740 to access other electronic files using
25 electronic links embedded in a particular electronic file. An electronic link system will
26 be described later in detail.

27 With these examples of basic processes the viewer 266 is able to display book
28 selections and display text from those books.

d. Menu System

Referring generally to Figure 13, the delivery system 200 may have a menu system 851 for selecting features and electronic books from the delivery system 200. The operating software and memory required for the menu system 851 may be located at the viewer 266 (e.g., the instruction memory 732 and/or book memory 728). However, it may also be located at the library unit 262 (e.g., the instruction memory 632) or the library unit 262 and the viewer 266 can share the software and memory needed to operate the menu system 851. Since the menus are usually displayed on the viewer 266 and it is preferred that the viewer 266 be capable of operating in the absence of the library unit 262, the basic software and memory to create the menus is more conveniently located at the viewer 266.

The menu system 851 allows sequencing between menus and provides menu graphics for graphical displays such as on the LCD display 602 of the viewer 266. In a system which uses a set top converter these menus may also be displayed on a television screen. In the simplest embodiment, the menus provide basic text information from which the subscriber makes choices. In more sophisticated embodiments, the menus provide visual displays with graphics and icons to assist the subscriber.

Figure 13 depicts a menu system 851 with sequencing. The primary menus in the system are an introductory menu 850, a main menu 854 and various submenus 858. In the embodiment shown, there are three levels of submenus 858. In certain instances one or two submenus 858 is sufficient to easily direct the subscriber to the selection or information requested. However, there are features in which three or more submenus 858 make the user interface more friendly for the subscriber. Each level of submenus 858 may consist of multiple possible menus for display. The particular menu displayed depends on the selection by the subscriber on the previous shown menu. An example of this tree sequence of one to many menus are the help submenus 887, 888. Depending upon the specific help requested, a different level two help menu is displayed to the subscriber.

1 An example of an introductory menu 850 is shown on Figure 14a. Generally the
2 introductory menu 850 introduces the viewer 266 to the system and provides initial
3 guidance, announcements and instruction. The introductory menu 850 is followed by a
4 main menu 854, an example of which is shown in Figure 14b. The main menu provides
5 the viewer 266 with the basic selection or features available in the system. Figure 14b
6 is an example of a main menu 854 offering many additional features and submenus 858
7 to the subscriber. For example, Figure 14b shows that the viewer 266 is able to choose
8 by a point and click method, many options including: (1) free previews, (2) books you
9 can order, (3) books in your library, (4) your current book, (5) help, (6) on-line services
10 and (6) other system features. Following a selection on the main menu 854, a
11 corresponding submenu 858 is shown.

12 Figure 13 shows thirteen available primary or first level submenus. They are (1)
13 account set up 862, (2) free previews 866, (3) book suggestion entries 855, (4) books in
14 your library 872, (5) books you can order 878, (6) your current book 884, (7) help 887,
15 (8) available features 890, (9) messages 893, (10) account information 896, (11) outgoing
16 message submenu 898, (12) show links 970, and (13) create links 980. Figure 14c is an
17 example of a first level submenu for electronic books in your library 872. This "Book In
18 Your Library" example submenu 872 shows six available electronic books by title and
19 author and provides the subscriber with the ability to check a different shelf of books 874
20 or return to the main menu 854. Figures 14d and 14e show example submenus 858 for
21 electronic books that may be ordered using the "Books You Can Order" submenu 878.

22 Figure 14f is an example of an order selection and confirmation menu 880', which
23 provides a "soft keyboard" 975 for the subscriber to use in placing an electronic book
24 order and which confirms the subscriber's order. In this particular example, the
25 subscriber is required to enter a PIN number to complete the subscriber's order. The
26 "soft keyboard" 975 could be configured as a full alpha-numeric keyboard, and may be
27 used by the subscriber to add additional information related to a book order. An alpha-
28 numeric or similar password may be used to ensure the subscriber is an authorized

1 subscriber. In an embodiment, the subscriber confirms an order with a PIN or password
2 and then receives a final confirmation screen. The final confirmation screen is primarily
3 text and may state: Your book order is now being processed via CABLE.

4 Your book will be delivered overnight and your VISA account will be charged
5 \$2.95.

6 Your book will be available for reading at 6:00AM EST tomorrow. Make sure
7 that:

8 1. your Library Unit and Cable Connection Unit are plugged in with
9 aerials up tonight; and

10 2. you tune your cable converter to THE BOOK Channel. The TV set
11 does not have to remain on.

12 or similar language.

13 Examples of the "Account Set Up Menu" 862 and further submenus 858 related
14 to account set up (which provide instructions and account input 864) are shown in
15 Figures 14g and Figure 14h. These submenus 858 allow initialization of an account at
16 the operations center 250 and orders to be charged to credit cards. The submenus 858
17 include the ability to enter data related to your desired PIN number or password, credit
18 cards, phone numbers, etc. It is preferred that the account set up be performed using the
19 telephone system. A confirmation menu verifies that the account has been properly set
20 up with the desired PIN or password and credit card.

21 Free previews for books 866 are also provided by submenus (868, 870).
22 Examples of the free preview menus are shown in Figure 14i and Figure 14j. Figure 14i
23 shows a menu depicting various electronic books for which previews are available for
24 viewing. Following an electronic book selection, a screen submenu showing an excerpt
25 of the selected electronic book cover's description is provided along with an excerpt from
26 a critic's review of the selected electronic book. In the preferred embodiment, this
27 preview screen for a particular electronic book also allows the subscriber to select a
28 submenu which provides information about the author. The book preview submenu may

1 also include a still video picture or graphics portraying a book cover or a scene from the
2 electronic book. An example of such a still video picture or graphics is shown in Figure
3 14j which depicts a preview screen 870 about the author. The video may also be
4 provided according to MPEG standards as a short moving video clip. Such a clip could
5 be an interview with the author, for example. The author's preview screen 870 shows a
6 picture of the author, provides a short biography, and may allow the subscriber to order
7 the author's books. The price for ordering the authors various electronic books may also
8 be shown on the menu. Alternatively, the previews may be provided through an
9 electronic link system, which will be described in detail later.

10 In addition to free previews, in more sophisticated embodiments, the delivery
11 system 200 provides the subscriber with an electronic book suggestion feature (see 855).
12 This is accomplished using the menu system 851 and the processor with associated
13 memory located at the viewer 266, library unit 262 or at the distribution point (1020 or
14 250). When necessary, information for the program suggestion feature is sent in the text
15 data of the composite or video signal to the home system 258. With this feature, books
16 or authors are suggested to a subscriber based upon historical data of the subscriber's
17 previous orders, demographics or mood of the subscriber, other indicators, and/or by text
18 word searches.

19 In a book suggestion embodiment, text word searches of preview information
20 (such as book cover descriptions, critics reviews and biographies about the author) and/or
21 text of books or other titles are performed by the library unit 262 using databases stored
22 in the library memory 600. Personalized book or author suggestions are made to the
23 subscriber by obtaining information from the subscriber indicative of general subscriber
24 interests. Subscriber entries are solicited from the subscriber preferably using the
25 electronic book suggestion entries submenu 855. The system uses these subscriber
26 entries either directly or indirectly to search for books or authors to suggest to the
27 subscriber.

1 Generally, the book suggestion methods may be categorized into two categories,
2 either responsive methods (which respond to a series of subscriber menu entries), or
3 intelligent methods (which analyze data to suggest an electronic book). Using a
4 responsive or intelligent method, the delivery system 200 determines a list of suggested
5 titles or authors and creates a second or third level submenu 856, 857 to suggest the titles
6 for subscriber selection.

7 Responsive methods of suggesting titles include, for example, the use of mood
8 questions, searching for authors, and keyword searching. Using the instruction memory
9 732 and menu generation hardware (e.g., 607) of the viewer 266, a series of mood
10 questions can be presented on menus to determine a subscribers interest at a particular
11 time. For this methodology, the operations center's 250 processor 404 and instruction
12 memory 416 assign each title mood indicators (and subindicators) from a group such as
13 light, serious, violent, short, long, dull, exciting, complex, easy-read, young theme, old
14 theme, adventure, romance, drama, fiction, science-fiction, etc. These indicators are sent
15 to the home system 258 with the text data and are stored in library memory 600. Based
16 upon the subscriber entries, the processor 404 associates a set of indicators with the
17 subscriber's request and a set of electronic books with matching indicators are located for
18 suggesting to the subscriber.

19 Responsive searches for authors or keywords (a search word provided by the
20 subscriber) are generally performed by the library processor 628 and instruction memory
21 632 on data stored in the library memory 600. For example, a keyword given by the
22 subscriber may be searched for a match in library memory 600 storing the book reviews,
23 critics and previews databases. Thus, if a subscriber provided an entry of the word
24 "submarine" on an appropriate submenu, the title "Hunt For Red October" may be located
25 by the library processor 628 using instruction from a routine in the instruction memory
26 632.

27 Intelligent methods of suggesting programs include analyzing personal profile
28 data on the subscriber and/or historical data about the subscriber such as past books

1 ordered by the subscriber (or buy data). This method is preferred in a book on demand
2 system and can be performed at the distribution point or operations center 250 by the on-
3 site processor 404 using subscriber databases stored in memory 428. The home system
4 258 receives the text data including program suggestion information from the distribution
5 point or operations center 250 and generates the program suggestion submenus 855, 856,
6 857 using the same text data receiving 212 and viewer menu generation hardware (e.g.,
7 607, 621) described above. Software routines and algorithms stored in instruction
8 memories (e.g. 632, 732) are used to analyze historical data and book ordered data to
9 determine a line of books to suggest to the subscriber.

10 The algorithms for this powerful feature of suggesting books or authors to
11 subscribers are disclosed in great detail in U.S. Patent No. 5,559,549, entitled
12 REPROGRAMMABLE TERMINAL FOR SUGGESTING PROGRAMS OFFERED ON
13 A TELEVISION PROGRAM DELIVERY SYSTEM, issued September 24, 1996, and
14 are incorporated herein by reference.

15 Referring to Figure 13, submenus 858 are shown on the "Books In Your Library"
16 submenu 872 and are preferably broken into shelf numbers with submenus for each shelf
17 874, 876. The submenus 858 for the "Books You Can Order" submenu 878 is similarly
18 broken out into submenus by shelves 880, 882. These shelves may each be a category or
19 genre of books. Electronic books may be grouped into categories such as best sellers,
20 novels, fiction, romance, etc. See Figure 14d.

21 Referring to Figure 13, the submenu 858 for "Your Current Book" 884 allows a
22 subscriber to select a current book 884 and then determine what page to view. This
23 selection is confirmed with a level two submenu 885. The help submenu 887 provides
24 the subscriber with additional help screens 888. The submenus 858 for available features
25 890 are preferably broken out into a sequence of separate submenus for each feature 891,
26 892.

27 Referring to Figure 13, messages can also be sent with the delivery system 200.
28 A level one message screen provides the subscriber with the ability to select from various

1 messages the subscriber has pending 893. Each message is then shown on a separate
2 submenu screen 894, 895. The message may contain text and graphics.

3 Referring to Figure 13, account information is shown on a level one submenu 896
4 and then follow-on submenus 858 show the recent orders and your account balance 897.
5 There is also a level one submenu for outgoing messages 898 which has a follow-on
6 submenu used as an input screen 899.

7 In addition to the specific features and submenus described in Figure 13 and
8 Figure 14a through Figure 14j, many other variations and features are possible. When
9 a book is finally selected for viewing the title page 886 will appear on the screen followed
10 by a page of text.

11 III. The Billing And Collection System

12 The billing and collection system 278 (shown in Figures 2 and 3) utilizes the
13 latest technology in electronic transaction and telephone switching to track orders,
14 authorize deliveries, bill consumers, and credit publishers automatically. The telephone
15 calls initiated by the phone connector 270 are received by the billing and collection
16 system 278 which responds immediately without human intervention by placing the order
17 and charging the consumers credit card account. Data is compiled periodically and
18 publishers 282 are credited for sales of their books or other text. The billing and
19 collection system 278 may also connect with subscribers through two-way cable
20 connections, cellular, or other communication means.

21 It is preferred that the billing and collection system 278 communicate with the
22 operations center 250 to track changes in available books and to provide statistical data
23 to the operations center 250.

24 IV. Public Library, School, and Bookstore System

25 The electronic book system can be modified to be used at public libraries, schools
26 and bookstores. Figure 15 shows one possible arrangement of components for a public
27 library, school or bookstore location. The main unit at a public library, school or
28 bookstore is the file server 900. The file server 900 is a large electronic memory unit that

1 can store thousands of electronic books. Various electronic storage means may be used
2 in the file servers, such as hard disks, read-write CD ROMs and read-only CD ROMs.

3 The system comprises five components; the file server 900, a converter or video
4 connector 904, a controller 908, a viewer 912, and a catalog printer 916. The software
5 for controlling the system is primarily located in the controller 908. The converter or
6 video connector 904 is similar to those described above. In this configuration the
7 controller unit 908 monitors the data being transferred to the file server 900 by the
8 converter 904. The controller 908 is preferably provided with a viewing screen and
9 several control buttons. When it is necessary to have a larger screen to perform more
10 sophisticated controlling of the system a viewer 266 may be connected to the controller
11 908 and the viewer screen and controls 740 may be used.

12 The controller 908 is only able to download books to public viewers 912 which
13 are authorized to receive books from the particular file server 900. For security reasons
14 it is not desirable that the public viewer 912 have access to more than one file server 900.
15 In this way, security can be maintained over the text data for books. It is preferred that
16 the public viewer 912 be limited to receiving one or two electronic books at a time from
17 the controller 908. When the subscriber of the public viewer 912 needs a new or
18 additional electronic book, the subscriber returns the viewer 912 to the school or public
19 library where the subscriber receives a new electronic book from the controller 908.

20 In order to track the electronic books that are available on the file server 900, the
21 titles of the available books may be printed on a catalog printer 916. The catalog printer
22 916 is connected to the library controller 908 and the titles of the electronic books are
23 downloaded to the catalog printer 916. None of the coded text for any of the electronic
24 books can be printed using the controller 908 and catalog printer 916 of this system. In
25 order to maintain security over the data, none of the electronic book data is allowed to be
26 downloaded to the printer 916. Once a complete printout of available electronic book
27 titles, magazines, or other textual material is complete, a hard copy of the catalog 920 can
28 be maintained at the file server 900.

1 The system shown may also be used at bookstores. The bookstores can rent the
2 public viewer 912 to customers with the text for one or two electronic books loaded onto
3 the public viewer 912. The public viewer 912 may be provided with an automatic
4 timeout sequence. The timeout sequence would erase the textual data for the books after
5 a certain period of time, for example, two weeks. It is expected that after a period of time
6 (perhaps within two weeks) the renter would return the public viewer 912 to the
7 bookstore and receive additional electronic books for viewing. Using this arrangement,
8 it is also possible for the bookstore to (permanently) sell a viewer 912 to a regular
9 customer. The customer then returns to the bookstore from time to time to receive textual
10 data for an electronic book which the customer can then store permanently on the
11 customer's own viewer 912. Various other configurations are possible for bookstores,
12 schools and public libraries using the file server 900 and public viewer 912 described.

13 V. Use of a Set Top Converter

14 Existing set top converters such as those made by Scientific Atlanta or General
15 Instruments are presently unequipped to handle the delivery system 200 of the present
16 invention. Although set top converters may be built which include the library functions,
17 hardware modifications are necessary in order to use the delivery system 200 with
18 existing set top converter technology.

19 Figures 16a and 16b are examples of hardware modifications or upgrades. A port
20 is used to attach hardware upgrades described below to a set top terminal. Two upgrades
21 are possible to set top converters 601 to assist in receiving and selecting electronic books.
22 A menu generation card upgrade (Figure 16a) and an information download unit (Figure
23 16b). Each of these upgrades may be connected to the set top terminal unit through an
24 upgrade port. A four wire cable, ribbon cable or the like may be used to connect the
25 upgrade to the set top converter 601.

26 A card addition 950 to a set top converter 601 is depicted in Figure 16a. The card
27 950 shown provides the additional functionality needed to utilize the book selection
28 system with existing set top converter 601 technology. The card 950 may be configured

1 to slip inside the frame of a set top terminal and become part of the set top terminal, an
2 advanced set top terminal. The primary functions the card 950 adds to the set top
3 converter 601 are the interpreting of data signals, generating of menus, sequencing of
4 menus, and, ultimately, the ability of the subscriber to select an electronic book using
5 either the television or a viewer 266. The card 950 also provides a method for a remote
6 location, such as the cable headend, to receive information on electronic books ordered.
7 The electronic books ordered information and control commands may be passed from the
8 cable headend to the card 950 using telephone lines.

9 The primary components of the card 950 are a PC chip CPU 952, a VGA graphic
10 controller 954, a video combiner 956, logic circuitry 958, NTSC encoder 960, a receiver
11 962, demodulator (not shown), and a dialer 611'. The card 950 operates by receiving the
12 data text signal from the cable headend through the coaxial cable. The logic circuitry 958
13 of the card 950 receives data 964, infrared commands 966, and synchronization signals
14 (not shown) from the set top converter 601. Menu selections made by the viewer 266 on
15 the remote control are received by the set top converter's 601 IR equipment and passed
16 through to the card 950. The card 950 interprets the IR signal and determines the
17 electronic book (or menu) the subscriber has selected. The card 950 modifies the IR
18 command to send the information to the set top converter 601. The modified IR
19 command contains the channel information needed by the set top converter 601. Using
20 the phone line 968 and dialer 611', the card 950 is able to transmit electronic books
21 ordered information to the cable headend. It is also possible to receive the electronic
22 books over the telephone lines and by-pass the video distribution system. In this
23 embodiment, the telephone system may be used to provide access to an Internet web site
24 to order and receive electronic books.

25 These commands are passed through the interface linking the set top terminal's
26 microprocessor with the microprocessor of the hardware upgrades. In this way,
27 subscriber inputs, entered through the set top terminal keypad or remote control, can be
28 transferred to any of the hardware upgrades for processing and responses generated

1 therein can then be sent back to the set top terminal for display. In the preferred
2 embodiment the IR commands 966 are transferred from set top terminal 601 to hardware
3 upgrade.

4 Hardware upgrades may include a microprocessor, interactive software,
5 processing circuitry, bubble memory, and a long-term memory device. In addition to
6 these basic components, the hardware upgrade may make use of an additional telephone
7 modem or CD-ROM device.

8 The information download hardware upgrade 1001 (shown in Figure 16b) allows
9 the subscriber to download large volumes of information from the operations center 250
10 or cable headend using the set top converter 601. The hardware upgrade 1001 will enable
11 subscribers to download data, such as electronic books and magazines, to local storage.
12 Primarily, the hardware upgrade 1001 is an additional local storage unit 1003 (e.g., hard
13 disk, floppy, optical disk or magnetic cartridge and may include a microprocessor 1005,
14 instruction memory 1007, and a random access memory 1009, as shown in Figure 16b).
15 Preferably, a small portable viewer 266 is also provided with the upgrade 1001 to enable
16 downloaded text to be read without the use of a TV.

17 The downloadable information may be text or graphics supplied by the operations
18 center 250 or cable headend. With this upgrade, electronic books may be downloaded
19 and read anywhere with the portable viewer 266. Using this upgrade, books may be
20 downloaded and stored in compressed form for later decompression. The electronic
21 books would be decompressed only at the time of viewing. Important text that the public
22 desires immediate access may made available through this system. Text such as the
23 President's speech, a new law, or a recent abortion decision rendered by the Supreme
24 Court may be made immediately available.

25 In the preferred embodiment, electronic book ordering information is stored at
26 each set top terminal until it is polled by the cable headend using a polling request
27 message format. An example of a polling request message format consists of six fields,
28 namely: (1) a leading flag at the beginning of the message, (2) an address field, (3) a

1 subscriber region designation, (4) a set top terminal identifier that includes a polling
2 command/response (or P/F) bit, (5) an information field, and (6) a trailing flag at the end
3 of the message. A similar response frame format for information communicated by the
4 set top terminal to the cable headend in response to the polling request may be used.

5 Figure 17 shows a preferred set top converter that includes a data receiver 617'
6 and a data transmitter 1011. The data transmitter provides upstream data
7 communications capability between the set top converter 601 and the cable headend.
8 Upstream data transmissions are accomplished using the polling system described and,
9 using a data transmitter 1011. Both receiver 617' and transmitter 1011 may be built into
10 the set top converter 601 itself or added through an upgrade module. Regardless of the
11 specific hardware configuration, the set top terminal's data transmission capabilities may
12 be accomplished using the hardware shown in Figure 17.

13 Figure 17 shows RF signals, depicted as being received by a data receiver 617'
14 and tuner 613 working in unison. Both of these devices are interfaced with the
15 microprocessor 1013, which receives inputs 1015, from the subscriber, either through a
16 set top converter's keypad, a remote control unit or the viewer 266. All cable signals
17 intended for reception on the subscriber's TV are accessed by the tuner 613 and
18 subsequently processed by the processing circuitry 1017. This processing circuitry 1017
19 typically includes additional components (not shown) for descrambling, demodulation,
20 volume control and remodulation on a Channel 3 or 4 TV carrier.

21 Data targeted to individual set top converters is received by the data receiver 617'
22 according to each set top converter's specific address or ID. In this way, each addressable
23 set top converter only receives its own data. The data receiver 617' may receive set top
24 converter 601 specific data in the information field of the signal frame described or on
25 a separate data carrier located at a convenient frequency in the incoming spectrum.

26 The received data includes information regarding electronic books and menus
27 available for selection. The subscriber may enter a series of commands 1015 using a
28 keypad or remote control in order to choose an electronic book or menu. Upon receipt

1 of such commands, the microprocessor 1013 instructs the tuner to tune to the proper
2 frequency of the channel carrying data and subsequently instructs the processing circuitry
3 1017 to begin descrambling of this data.

4 Upon selection of the electronic book, the microprocessor 1013 stores any
5 selection information in local memory (not shown) for later data transmission back to the
6 cable headend. The microprocessor 1013 coordinates all CATV signal reception and also
7 interacts with various upstream data transmission components. Typically, the data
8 transmitter 1011 operates in the return frequency band between 5 and 30 MHZ. In an
9 alternative embodiment, the frequency band of 10 to 15 MHZ may be used. Regardless,
10 however, of the frequency band used, the data transmitter 1011 sends information to the
11 cable headend in the information field of the response frame described. Those skilled in
12 the art will recognize that a number of variations and combinations of the above-
13 described set top terminal hardware components may be used to accomplish upstream
14 data transmissions.

15 VI. Books-On-Demand System

16 The electronic book system 200 described may also be configured in a book-on-
17 demand style. Figure 18a shows one example of a configuration for a books-on-demand
18 system. A books-on-demand system requires more powerful two-way communications
19 between the consumer's home, bookstore, school or public library and either the
20 operations center 250 or a distribution site 1020 such as the cable headend. This type of
21 two-way communication can be provided by the hardware shown in Figure 17 and
22 described above.

23 Referring to Figure 18a, in a books-on-demand system, the subscriber selects the
24 electronic book to be download from an available menu of electronic books (see for
25 example Figures 14d and 14e). The data for menus of available books is usually sent to
26 the subscriber location by the distribution site 1020. After the subscriber's menu
27 selection, information about the subscriber selection (or request) is then communicated
28 to either a distribution point 1020 (such as a cable headend or an Internet web site) or the

1 operations center 250. Upon receipt of this request, the needed textual and graphical
2 information for the book is spooled and sent to the subscriber. In this manner, books are
3 only sent when requested by the subscriber and are sent immediately upon demand for
4 the book (or text).

5 In order to support such a books-on-demand system, the text delivery and
6 distribution must be conducted on a strong nodal architected distribution system, such
7 as, a video-on-demand cable or telephone television system, an Internet web site, or
8 through use of individual telephone access on the public telephone system.

9 The books-on-demand system allows for a greater selection of electronic books
10 to the subscriber and limits the amount of communicated book data that is unnecessary
11 or unneeded. It also provides the electronic book to the subscriber in a much timelier
12 fashion.

13 In addition to a stronger distribution system, a books-on-demand system requires
14 a distribution point 1020 to have more sophisticated equipment to access and "spool out"
15 the textual information. This can be accomplished using file server technology 1024 for
16 storing the electronic books and ATM 1028 or telephone-type switching (not shown) to
17 distribute the textual information. The file server 1024 and distribution technology that
18 can be used in configuring such a books-on-demand system is described in U.S. Patent
19 No. 5,262,875 and U.S. Patent 5,218,695, cited above.

20 Figure 18a shows an embodiment for a books-on-demand system that utilizes file
21 server technology. In addition to electronic books, the embodiment of Figure 18a will
22 support distribution of nearly any digital data. Electronic books or textual files are
23 received from publishers 282 and other sources through local feeds 1032, ATM 1028, or
24 by satellite dish 1036. The data is then stored in memory 1040 at the file server 1024.
25 The distribution point 1020 may be a cable headend that receives requests from
26 subscribers and delivers text to subscribers over a two-way communication system (such
27 as a video-on-demand system (VOD) 1044). Alternately, an Internet web site may serve
28 as the distribution point 1020.

1 The library unit 262 can be connected to either a basic premium-type service cable
2 system 1048, a near video-on-demand type cable system (or pay-per-view (PPV) 1052)
3 or a video-on-demand cable system 1044. In connecting with either of these three
4 systems the library unit 262 may access the cable directly or may access the system
5 through a set top terminal 601', 601", or 601'''.

6 Using the two-way video-on-demand system 1044, a subscriber is able to request
7 a specific electronic book title and receive that text immediately following its request.
8 To accomplish this, the distribution point 1020 transmits a list of available electronic
9 books through the cable delivery system to the library unit 262. The library unit 262
10 displays the list of available electronic books on a menu or similar format. As described
11 earlier, it is preferred that the library unit 262 use menus which list categories of available
12 electronic books to form its request from the distribution point 1020. After selecting an
13 electronic book, the library unit 262 sends a request signal on the two-way
14 communication system 1044 back to the distribution point 1020. This request signal can
15 be handled in two ways. The library unit 262 either initiates the request or the
16 distribution point 1020 polls the various libraries on to the two-way system 1044. Upon
17 receiving the request for the electronic book title, the text associated with that book title
18 is transmitted to the library unit 262 using the two-way cable system 1044.

19 Figure 18b is an expanded view of a preferred operations center 250 that supports
20 a regional or national books-on-demand system. In fact, the operations center 250 shown
21 supports distribution of nearly any digital data. The operations center 250 supports
22 multiple feeds to receive digital information by tape 1060, 1060', ATM 1028, or satellite
23 1036. The information is processed through an input MUX 1064 and a small file server
24 1068 before reaching the master file server 1072. Digital data such as electronic books
25 received from publishers 282 is then stored on the master file server 1072. It is preferred
26 that the digital data is stored compressed in a standard format such as MPEG2.

27 A system controller 1076 provides control over the regional or national books-on-
28 demand system. Electronic books may be packaged into groups to provide feeds to

1 various cable headends. In addition, scheduling and marketing research are conducted
2 at the operations center 250. In order to handle the scheduling and market research,
3 electronic book buy data is received at the operations center 250 through a multiplexer
4 1082. Electronic book buy information can be provided by the operation center 250 to
5 the billing and collection system 278.

6 The operations center 250 is also equipped to insert messages or advertisements
7 into the file server. These messages or advertisements will eventually be received by the
8 subscribers.

9 The master file server 1072 uses an output multiplexer 1080 and ATM 1028 as
10 well as satellite connections to distribute digital data. In the preferred embodiment, cable
11 headends receive text data on electronic books from the master file server 1080 through
12 the output multiplexer 1028 and an ATM system 1028. After receiving the electronic
13 book data, the cable headends store the books in a local file server 1024. Figure 18a's
14 distribution point 1020 is an example of a cable headend which may receive data from
15 the operations center 250 of Figure 18b through an ATM hookup 1088 or satellite
16 hookup.

17 VII. Electronic Book Link System

18 Electronic book links allow the subscriber to use the electronic book viewer 266
19 to traverse pre-defined paths between content in their currently viewed electronic book
20 to related information contained either elsewhere in the electronic book, elsewhere on the
21 viewer 266, or external to the viewer 266, including in the library unit 262 or in a
22 connected Internet web site. These links provide an organized and methodical method
23 for the subscriber to quickly access related topic areas or seek clarification of the
24 currently viewed material.

25 An electronic book includes first locations, or components, such as words,
26 phrases, sentences, sections of text, paragraphs, pages, chapters, figures, drawings, maps,
27 video clips, and audio clips. Links to second and subsequent locations, or components,
28 contained in the same electronic document or in another related electronic document, file,

1 or database can be associated with each of these first components. First components with
2 underlying links can be highlighted and displayed on the viewer display 602 or on the
3 connected television 259 or a personal computer 261 (see Figure 2). First components
4 that have underlying links associated with them may be identified by assigning them a
5 unique identifier. The unique identifier can be a word or phrase, an alpha-numeric value,
6 a coordinate point, or other unique identifier. In an embodiment, each such first location
7 may be assigned an identifying index value.

8 The use of the index value allows the first components to maintain links with
9 other components, even if the electronic book is altered. For example, a subscriber may
10 use a cut and paste edit feature to move a block of text containing a first component.
11 Cutting and pasting will not affect the status of the first component and its links to other
12 components. Similarly, changing font style or font size will not affect the status of the
13 links.

14 In the creation of an electronic book, or subsequently, the electronic book may
15 undergo a process that maps identifying index values to each of the first components.
16 These index values can then be accessed by software directives that drive the presentation
17 of alternative or linked material (e.g., material at one of the second locations) once a
18 selection is made. For each electronic book, these index values may be contained in a
19 hidden table that maps the identifying index values of all first components with
20 underlying links to the location of the linked material (the second location). Moreover,
21 each such first component may be linked to one or many linked material locations. That
22 is, the first component may be linked to a second component, a third component and so
23 on. An example of a hidden table is presented below.

24 As shown in the table, a first location "Cezanne" has an identifying index value
25 135. "Cezanne" has three links. A link to a second location is to an art encyclopedia.
26 A link to a third location is to an electronic dictionary that provides a pronunciation
27 guide. A link to a fourth location is to an audio file that plays a short biography of the
28 artist. Each of the second, third and fourth locations have their own index values.

Identifying Index Value(s)	Component Identifier	Link Number	Linked Material Identifier	Linked Material Description	Linked Material Location (file location / file name / corresponding index value)
135	"Cezanne"	1	More on Cezanne	Reference material on Cezanne	Art-Encyclopedia.com/FrenchArtists/Index Value = 1
135	"Cezanne"	2	Pronunciation	Pronunciation of the word	Websters.com/ Websters E-Dictionary/Index Value = 56221
135	"Cezanne"	3	Audio Clip	Audio file providing condensed Cezanne's biography	Viewer/ Current file/Index Value = 199384
133-135	"PorchScene by Cezanne"	1	Graphic File	JPEG file presenting Cezanne's PorchScene painting	Viewer/ Current file/Index Value = 9382
5673	"reactivism"	1	Definition	Definition of the word	Websters.com/ Websters E-Dictionary/Index Value = 564
4948-4950	"Order <u>Little Women</u> " menu item	1	Book Order	Order the book <u>Little Women</u>	Discovery.com/ Little Women Order/Index Value = 672
4949-4950	" <u>Little Women</u> "	1	Book review	Review of the book "Little Women"	LiteraryWorks.com/ Little Women/Index Value = 1
90462	"Dental diseases"	1	TOC link to Document Body	Link from Table of Contents to desired chapter	Viewer/ Current file/Index Value = 69980
1342	"Dental diseases"	2	Related discussion group	Access to Web discussion group on gum diseases	NoMoreCavities.com/ Index Value = 1
572	"VeggieMaster"	1	Product Order	Order the product "VeggieMaster"	HomePurchases.com/ KitchenProducts / Index Value = 1
14	"Chesapeake"	1	Video	Video clip of interview with J. Michener on writing of Chesapeake	Viewer/ Current file/Index Value = 38677
14	"Chesapeake"	2	Narration	Audio file – narration of Chesapeake by J. Michener	Viewer/ Current file/Index Value = 38678

Linked material location information (i.e., the location of second and subsequent components) can include source location, book name, chapter, page, line, and word as

1 identified by their index value. The source location will provide the delivery system 200
2 the necessary information to contact the operations center 250, the Internet web site 279
3 (see Figure 2) or another electronic database and request the appropriate material for
4 retrieval and download if it currently does not reside on the viewer 266 or the home
5 system 258. In the case that the linked material resides on the Internet web site 279 or
6 on another electronic database, the location information in the hidden table allows the
7 operations center 250 or home system 258 to retrieve the desired material from the
8 Internet web site 279 or from the electronic database.

9 If the second component, or linked material, is located at the viewer 266, the
10 processor in the viewer 266 can cause the linked material to be displayed without any
11 communications with an outside source. For example, if the first component is the name
12 "Cezzanne" and the linked material, or second location, is in an electronic dictionary
13 stored in the viewer 266, the viewer 266 can display the electronic dictionary entry for
14 "Cezzanne." This linked material may be displayed full screen, in a picture-in-picture
15 window, or as an overlay, for example. The entry can also remain hidden, until a user of
16 the viewer 266 commands the entry to be displayed.

17 Upon selection of a component with underlying links, the software directive
18 determines the identifying index values associated with the selected component, searches
19 the table for the index values of the selection made, looks up the corresponding linked
20 location, accesses the location, and displays the linked material on the viewer 266. The
21 linked material can be displayed on the viewer 266 in place of the original source
22 material, or simultaneously with the original source material by displaying the linked
23 material in a picture-in-picture window, via a split screen, or via a screen overlay.

24 Figure 19 shows a portion of a page of electronic text having one or more
25 electronic links. The display 602 may include a show links button 606 and a help button
26 612. The show links button 606 may be used to display a link menu 971 (see Figure 13
27 and Figure 20). That is, the viewer 266 can be commanded, via the show links button
28 606, to display all components that have underlying links. The components may be

1 displayed in a highlighted mode, in a different color, in a unique font, bold or italic
2 typeface, underlined, outlined, or in reverse background mode, for example. To make a
3 selection of a component to view the underlying linked material, the cursor 745 is used
4 to identify the desired selected item. The ball 743 is used to guide the cursor 745 across
5 the page to the desired selected item, and the selection button is used to make the
6 selection. Alternatively, cursor movement for screen navigation can be provided via
7 devices such as a fingerpad, mouse, or joystick. Selection can also be made by
8 incorporating a touch-sensitive screen into the viewer 266.

9 Figure 19 depicts the display before commanding the viewer 266 to show links.
10 Figure 20 shows the display once the request has been made to display all underlying
11 links. Figure 20 shows the link menu 971, a help button 612, and a multi-function
12 button, or pull-down menu, 614. The multi-function button 614 can be used as a return
13 button, a hide active links button, and a restore active links button, for example.
14 Alternately, several additional buttons may be provided to select these features. The
15 multi-function button 614 may be active when the show links button 606 has been
16 operated. In Figure 20, the components having underlying links are "PorchScene by
17 Cezanne" and "Cezanne." The component "PorchScene by Cezanne" is shown with
18 one link and the component "Cezanne" is shown with three links. Also shown in Figure
19 20 is the link menu 971 that lists the links, or components, the link number and a
20 description of the linked material. For example, the material linked to the component
21 "PorchScene by Cezanne" is a JPEG video file showing the painting.

22 Once a link is selected, an on-screen return button 614 allows the subscriber to
23 return from the linked material back to the originally viewed text. The show links button
24 606 (see Figure 19) can be displayed on the viewer 266 either at all times that an
25 electronic book is open, any time an underlying link exists, or only when commanded to
26 do so from the viewer's menu system 851.

27 When linked material is displayed (for example, in an overlay fashion) the
28 subscriber can command the linked material to be placed in a hidden state by operating

1 the hide active link button 614 or by use of the menu system 851. When an active link
2 is hidden, the restore active link button 614 is displayed. Operation of the restore active
3 link button 614 will display the material linked by the active link.

4 Alternatively, the on screen "Help" menu 887 (see Figure 13) provides access to
5 further assistance when selecting links. The Help menu 887 is accessed by operation of
6 the on-screen help button 612. Related link options will be available for display on the
7 viewer 266 by selecting the Help menu 887, using the cursor 745 to do so. The "Help"
8 function allows the subscriber to select which specific links to be displayed on-screen.
9 The links when displayed may be simply highlighted portions of text, or text in different
10 colors. All links for the displayed page can be selected to be displayed. Alternatively,
11 by selecting a range of content in an electronic book that may have multiple underlying
12 links, only links associated with the components within the selected range will be
13 presented on the viewer 266 for the subscriber to select the specific link desired.
14 Alternatively, a fixed number of links may be selected to be displayed on the screen at
15 a time. Alternatively, only a certain type of link may be selected to be displayed. The
16 types of links that are available for display may be listed in a pop-up menu. The
17 subscriber can choose from this pop-up menu which of the links to display. For example,
18 the pop-up menu could list links for a dictionary and links to an Internet web site. The
19 subscriber could choose to display only the dictionary links. Figure 21 depicts the menu
20 screen 981 used to manage the subscriber's filtering of links to view.

21 Figure 22 is a logical representation of the components and links for the example
22 first component "Cezzanne" shown in Figure 19. In Figure 22, the text block (page) 602'
23 containing the first component Cezzanne 980 is shown linked to components in other
24 electronic files or documents. A first link 981 links Cezzanne 980 to a reference material
25 component 982, which is an encyclopedic entry related to the artist. A second link 983
26 links Cezzanne 980 to a dictionary entry 984 that includes a pronunciation key for the
27 artist's name. A third link 985 links Cezzanne 980 to an audio clip 986, which provides
28 an audio file describing the artist's life. If the subscriber chooses the audio clip 986, the

1 audio file will immediately begin playing and will be broadcast on a speaker in the viewer
2 266, or the attached television or the attached personal computer, as applicable. The
3 subscriber can stop the playback by operating the hide active link button 614.

4 The links described above may also function in two directions. A biography of
5 Cezzanne could include a link to the JPEG file showing PorchScene. The JPEG file
6 PorchScene could be one of several still videos of the artist's work. This JPEG file could
7 be linked to an appropriate section of the Cezznne biography. Then, if the subscriber
8 were viewing the JPEG file for PorchScene, the subscriber could display the link to the
9 biography and, upon activating the link, have displayed that portion of the biography that
10 discusses PorchScene. In this example, the same link is used to display either the JPEG
11 file or text from the biography. The same hidden table can be used with the two
12 electronic files (i.e., the biography and the JPEG file). Alternately, each electronic file
13 may have its own hidden table. In this alternative, the same link may be referenced in
14 each of the hidden tables.

15 In the discussion above, each first component is linked to one or more other
16 components. However, the other components (i.e., the second and third components, for
17 example) may also be linked together. In addition, other components linked to one first
18 component may be cross-linked to other components that are linked to a second first
19 component (identifying secondary or tertiary cross-links). For example, the JPEG file of
20 PorchScene referred to in Figure 20 may be cross-linked to the audio file-biography
21 shown in Figure 20. Displaying the JPEG file will result in a cross-link being identified
22 that links the JPEG file to the audio file.

23 The cross-link may be indicated by highlighting, underlining, outlining, using a
24 bold or an italics typeface, using a different font, and using different color text. If the
25 cross-linked material is selected, that material will then be displayed. In the example
26 described above, the JPEG video file that shows the painting PorchScene can be cross-
27 linked with Cezzanne and its identity would be displayed on the viewer 266. The video
28 file could be displayed full screen or in a picture-in-picture format. The video file could

1 also be displayed on the attached television 259 or the personal computer 261 (see Figure
2 2). Finally, the video file could be printed by sending the video data and a print
3 command to a printer 262 attached to the home unit 258 or to the personal computer 261.

4 In the table previously shown, all the links for a number of electronic books were
5 provided in one hidden table. In an alternate arrangement, many hidden tables may be
6 provided. For example, each electronic book may be provided with a hidden table. In
7 this alternative, the many hidden tables could form a relational database of linked
8 material. As an example, several different electronic medical text books could each be
9 provided with its own hidden table. An electronic general medical encyclopedia could
10 also be provided with a hidden table. Terms that are listed in one of the several medical
11 electronic text books could then be linked, in a relational fashion to the electronic
12 medical encyclopedia. The several electronic medical text books could also be
13 relationally linked to each other, to on-line databases and to other electronic files. For
14 example, an electronic medical text book could be electronically linked to electronic
15 books, databases and other electronic files maintained at a medical school's library.

16 The hidden table (either for many electronic books, or individually for each
17 electronic book) may be provided by the central provider or distributor as an additional
18 feature that is paid for separately from purchasing an electronic book. The distributor
19 may offer many different levels of service, such as only linking material (components)
20 stored on a viewer, only linking material within a particular electronic book, or linking
21 one or more electronic books to electronic files outside the home system 258 (e.g.,
22 linking an electronic book to a database maintained by the distributor at an Internet web
23 site).

24 Downloading the most current links table for an electronic book from the
25 operations center 250 or the Internet web site 279 refreshes the hidden links table, that
26 is, any new links that have been generated by the operations center 250, for example, are
27 added to the hidden links table. The current links table may be downloaded in

1 conjunction with downloading a new electronic book. Alternately, the current links table
2 may be provided periodically by the operations center 250.

3 Subscribers can create their own links by adding new entries to the hidden links
4 table, using Hypertext Markup Language (HTML) or other standard programming
5 language or by using a simple graphical user interface, for example. In an embodiment,
6 an on-screen, software-based, menu-driven facility is provided, accessible through the
7 menu system 851 (see Figure 13), that allows the subscriber to select the desired source
8 components to define an underlying link, to select the desired linked components and
9 define their location, and to create the remaining table entries. Creation of table entries
10 can be supported via either an on-screen, simulated keyboard, the attached keyboard 267,
11 or the remote keyboard 268 (see Figure 6a). To ease creation of links, default table entry
12 items may be offered to the subscriber by the menu system 851 where ever possible. The
13 desired linked components can be accessed and displayed simultaneously with the desired
14 source components via the use of a picture-in-picture window, via a split screen, or via
15 a screen overlay. Alternatively, if the material to be linked is to be created by the
16 subscriber, the subscriber can create a new content file on the viewer 266 and link
17 directly to components in that newly created file. This allows the subscriber to create
18 customized annotations and notes that are directly associated with the specific
19 components of an electronic book. Text entry into the newly created file is handled via
20 either the on-screen, simulated keyboard, the attached keyboard 267, or the remote
21 keyboard 268.

22 As noted above, links within electronic books may be self-contained in nature,
23 where all the material to be linked to is resident within the same electronic book file.
24 Additionally, links may also be provided between material residing on the viewer 266.
25 Also, links may be provided to material that currently resides on the home system 258,
26 if separate from the viewer 266. Finally, links may be provided to material that must be
27 accessed through a communications network. For example, material that is ordered or
28 downloaded from the operations center 250 or the Internet web site 279 may be linked

1 to the electronic book. On screen menus can also be supported on the viewer 266 in the
2 form of electronic book files, serving as a book or product catalog or service catalog that
3 allows the subscriber to link to the operations center 250 or the Internet web site 279 to
4 order additional electronic books or products and services at any time by selecting the
5 desired component from the text.

6 If the content that is to be linked to is currently not available on the electronic
7 book viewer 266, the viewer 266 may prompt the subscriber to decide whether to: 1)
8 retrieve the corresponding material immediately from the home system 258, the
9 operations center 250, or the Internet web site 279; 2) wait until the next communication
10 opportunity with the home system 258 or operations center 250 to retrieve the material;
11 3) commence direct outside communications with another communications system (e.g.,
12 a telephone in a PSTN); or 4) stop.

13 In one embodiment, the first components on the viewer 266 are a Table of
14 Contents and List of Figures for a book. Making a selection from the Table of Contents
15 and List of Figures automatically links to and displays the selected page within the
16 electronic book file. In another embodiment, the first components on the viewer 266 may
17 be an Index of an electronic book. Selecting the desired topic and associated page will
18 cause that page to be displayed on the viewer 266. In yet another embodiment, the first
19 component is a footnote or endnote. When the footnote is selected, the viewer 266
20 provides a display of material that further addresses the reference. In another
21 embodiment, the first component is a word or phrase that has a further definition or
22 clarification associated with it. By selecting the first component, the corresponding
23 dictionary definition, foreign translation, or glossary entry will be displayed on the viewer
24 266. The dictionary definition or foreign translation may also be provided via an audio
25 file. In this embodiment, electronic books can be bundled with other standard reference
26 material or alternatively, stand-alone reference material like dictionaries or encyclopedias
27 may be accessed from within multiple electronic book files.

1 In another embodiment, the first component is a reference to another electronic
2 book altogether. By selecting the first component, the selected book is displayed on the
3 viewer 266. In another embodiment, on-screen menu buttons will be displayed on the
4 viewer screen 602 that allow for a quick link to the Table of Contents, Index, glossary,
5 and other key electronic book sections by simply selecting the item on the viewer screen
6 602 with the cursor 745. In yet another embodiment, the selected first component links
7 the subscriber to a book review or series of book reviews, providing additional
8 information to assist in the decision of selecting a new electronic book. In another
9 embodiment, the selected first component is a book title, chapter title, or text in the body
10 of a book that is linked to an audio file that serves as an audio narration of the selection
11 that is played on the viewer 266. In yet another embodiment, the selected first component
12 links to a video file (JPEG or MPEG) that can be displayed on the viewer screen 602.
13 Another embodiment is a first component that links to textual annotations and notes that
14 have been created by the subscriber.

15 One embodiment includes first or subsequent components that are electronic book
16 titles that, when selected, links the subscriber to the operations center 250 or the Internet
17 web site 279 to allow for the ordering of the selected book. In a similar embodiment, the
18 selected component consists of a product that, when selected, link the subscriber to the
19 operations center 250 site or an Internet web site to allow for the ordering of the selected
20 product. Lastly, in another embodiment, the selected component is a topic on which there
21 is a link to an Internet-based discussion group that addresses the topic in more detail.

22 When a link is provided to link a word or phrase to a foreign language dictionary,
23 the viewer 266 may display a foreign language selection feature. The subscriber may
24 then indicate which language to use when activating the link. For example, an English
25 word or phrase in the electronic book may be linked to a French, Spanish or German
26 dictionary. The subscriber may specify which of these foreign language dictionaries to
27 link to.

1 While this invention has been described in conjunction with the specific
2 embodiment outlined above, it is evident that many alterations, modifications and
3 variations will be apparent to those skilled in the art. Accordingly, the preferred
4 embodiments of the invention as set forth above are intended to be illustrative, not
5 limiting. Various changes may be made without departing from the spirit and scope of
6 the invention as defined in the following claims.